0189 H2 Electrolysis

Amino-acid-enabled electrolysis for lower-voltage, more energy-efficient hydrogen production

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THE OPPORTUNITY

Water electrolysis requires additional voltage above the decomposition potential, increasing electrical energy demand. The technology targets electrolyser developers and green-hydrogen producers seeking to reduce operating voltage through a simple electrochemical modification.

1 TECHNOLOGY

An electrochemical cell in which the electrolyte and at least one electrode include an amino- or carboxyl-containing compound, preferably an amino acid or peptide. Additives may be deployed in the electrolyte, at an electrode, or in both locations.

2 APPLICATIONS

- Alkaline water electrolysers for hydrogen production
- Electrolyser electrolyte and electrode formulation
- Retrofit evaluation for existing cell chemistries

3 KEY BENEFITS

- Lower hydrogen-production overpotential
- Potential electrical-energy reduction at a given current
- Demonstrated across multiple electrolytes, electrodes and amino acids

EVIDENCE & DEVELOPMENT STATUS

- Stage: preliminary evaluation with IAA-funded scale and longevity testing reported as underway.
- 1 M NaOH with 0.1 M glycylglycine reduced the reported potential by 0.1 V at 10 mA/cm².
- At 50°C, glycylglycine reduced potential by 0.1 V at 10 mA/cm²; alanine reduced the reported potential from about 1.8 V to about 1.5 V.
- Next milestone: complete scale and longevity validation, then approach development funders and potential licensees.

IP & OWNERSHIP

- Patent applications: EU, US, CN

PARTNERSHIP SOUGHT

- Electrolyser-industry validation partner
- Collaborative scale-up and durability testing
- Licensing and further development funding

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